at noon. Let r denote the rate of the man, s the distance he walks in time t, l his latitude *assumed to be constant*, h the hour angle after noon. Then from spherical trigonometry, $\cot\phi=\sin l\cot h$ (1). But $h=\frac{\pi t}{12}=\frac{\pi s}{12r}$, hence $\cot\phi=\sin l\cot\frac{\pi s}{12r}$ (2) which is the intrinsic equation of the path of the man, latitude assumed constant.

From this, $ds=\frac{12r\sin l}{\pi}\frac{d\phi}{1-\cos^2 l\sin^2\phi}$

$$x=\int\sin\phi ds=\frac{12r\sin l}{\pi}\int\frac{\sin\phi d\phi}{1-\cos^2 l\sin^2\phi}=\frac{12r}{\pi\cos l}\left[\tan^{-1}\frac{\sin l\tan(\frac{\pi}{4}+\frac{\phi}{2})}{1+\cos l}\right.$$

$$\left.-\tan^{-1}\frac{\sin l\tan(\frac{\pi}{4}+\frac{\phi}{2})}{1+\cos l}-\tan^{-1}\frac{\sin l}{1-\cos l}+\tan^{-1}\frac{\sin l}{1+\cos l}\right]\quad(3).\qquad y=\int\cos\phi d\theta$$

$$=\frac{12r\sin l}{\pi}\int\frac{\cos\phi d\phi}{1-\cos^2 l\sin^2\phi}=\frac{6r\sin l}{\pi}\log_e\left[\frac{1+\cos l\sin\phi}{1-\cos l\sin\phi}\right]\quad(4).$$

Since only y is desired, in (2) we let $s=6r$, then $\phi=\frac{\pi}{2}$, whence in (4) $y=\frac{6r\sin l}{\pi}\log_e\cot^2\frac{1}{2}l=\frac{12r\sin l}{\pi}\log_e\cot\frac{1}{2}l$ which is the distance traveled south in one-half day. In 3 days at 3 miles per hour $y=\frac{216\sin l}{\pi}\log_e\cot\frac{1}{2}l$.

QUERIES AND INFORMATION.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

Answers to Queries in the American Mathematical Monthly for March 1894. (Vol. I. No. 3. page 102).

Continued from the May number.

IV. In the spaces called after Riemann, called by Klein *elliptic*, the whole straight line is finite.

Two such straights, having crossed, recur to the point of crossing without going through any point at infinity.

V. In Euclid's constructions, only pieces of straights occur, each piece having two given end points. Such pieces are *sects*, always finite. But as soon as, with von Staudt, we admit a point at infinity, then we have straights with two ends, yet infinite; for the whole straight is infinite, and so its half is infinite.

One of the two costraight rays from a given point to a point at infinity is always infinite.

VI. In Lobatschewsky's geometry, all coplanar copunctal straights are divided, with reference to a given coplanar straight, into *cutting* and *not-cutting*, by two boundary lines, which do not cut the given line for any finite construction, but each of which has a point at infinity in common with the given line.

VII. Lobatschewsky's parallels are therefore coplanar straights which however far they can actually be produced do not meet, yet which meet at infinity.

In Lobatchewsky's space, two straight lines perpendicular to a third never intersect, how far soever they be produced; yet they are not parallel, for they do not even have a common point at infinity, which is as much an essential of parallelism in Lobatschewsky's non-Euclidean space as in von Staudt's Euclidean space.

GEORGE BRUCE HALSTED.

Remark on Mr. Stevens' Article in April Number.

From equation (2) $\log(-1)=\pi(1+2a)\sqrt{-1}$ we have by dividing, $\pi=\frac{\log(-1)}{(2a+1)\sqrt{-1}}$ or making $a=0, \pi=\frac{\log(-1)}{\sqrt{-1}}$, a most singular result in Mathematics. This result can also be expressed in the form, $\pi=2\sqrt{(-1)}\log\frac{1-\sqrt{(-1)}}{1+\sqrt{(-1)}}$.

COOPER D. SCHMITT.

QUERY.—Is there on the Western Continent a copy of the work of Giordano da Bitonto: Euclide restituto overe gli antichi elementi geometrici ristoranti, Roma, 1680. Folio?

TRANSLATOR OF LOBATSCHEWSKY, GEORGE BRUCE HALSTED.

EDITORIALS.

This issue is mailed a week late.

Dr. Paul Stackel writes from the University of Halle of his interest in the AMERICAN MATHEMATICAL MONTHLY'S Non-Euclidean Geometry.

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